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BY

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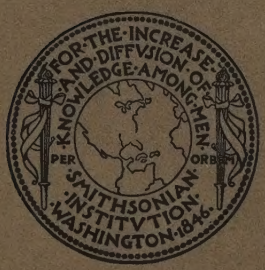

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After Fritz Müller described the genus *Batea* from the coast of Brazil in 1865, it was not again heard of until 1903 when Samuel J. Holmes observed it among material dredged by the United States Fisheries steamer *Fish Hawk* in 1900 near Woods Hole, Massachusetts. In 1901 Holmes also collected specimens at Woods Hole. During 1904 and 1905 the *Fish Hawk* took specimens from many localities about Vineyard Sound. Dr. C. J. Fish has presented to the United States National Museum specimens which he collected at Woods Hole in 1922. It thus appears that the genus is fairly common in the vicinity of Woods Hole. In 1918 three specimens of *B. catharinensis* were taken at Barbados by the Barbados-Antigua Expedition of the State University of Iowa.

Recently, while sorting the unidentified Amphipoda in the collection of the United States National Museum, I noted the occurrence of this genus at several new and widely separated localities. During 1889 and 1891 the *Fish Hawk* dredged specimens from several localities along the coast of South Carolina, and in 1891 she obtained specimens from Tangier Sound in Chesapeake Bay. In the course of the Biological Survey at Chesapeake Bay from 1915 to 1921 the *Fish Hawk* found this genus to be common in almost every part of the bay. Florida has to the present time yielded but one specimen of *B. catharinensis* and this without date or collector given.

The United States Fisheries steamer *Albatross* on her 1911 cruise, while in the Gulf of California, obtained the first representatives of the genus *Batea* from the west coast of America. In 1912 the Venice Marine Biological Station of the University of Southern California procured specimens from the entrance to Catalina Harbor, Santa Catalina Island. P. S. Barnhart of the Scripps Institution in 1915 obtained specimens off La Jolla, southern California, and Dr. Waldo L. Schmitt, while investigating the life history of

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the western spiny lobster in 1918, procured additional specimens from the same locality.

Batea is apparently a littoral genus and occurs at depths from 2 to 45 fathoms. This genus will probably be found to inhabit the entire tropical and temperate coasts of the Western Hemisphere. Comparatively few amphipods have been collected in these regions, but in almost every instance where systematic investigation has been carried on, this supposedly rare genus has been brought to light.

The *Albatross* in 1885 dredged from two localities off the west coast of Florida specimens of the family Bateidae which, on account of their prominent dorsal teeth, I have put into a new genus, *Carinobatea*. While at the Virgin Islands during the summer of 1915 I collected additional specimens of this new genus at several localities about the Island of St. Thomas.

To the present time members of this family have appeared in the waters of the Western Hemisphere only.

Family BATEIDAE Stebbing

The family as characterized by Stebbing in 1906 in "Das Tierreich" Amphipoda (p. 355) is as follows: Head strongly rostrate. Side-plate 1 rudimentary. Antenna 1 without accessory flagellum. Mandible with palp. Gnathopod 1 degraded, without hand. Telson cleft.

Genus BATEA

1865. *Batea* FRITZ MÜLLER, Ann Mag. Nat. Hist., ser. 3, vol. 15, p. 276.

Body not dentate. Side-plate 4 rather large and deeply excavate behind. Antenna 1 little shorter than antenna 2. Maxillipeds, outer plates not quite reaching apex of second joint of palp, and fringed with spine-teeth on inner margin. Gnathopod 1 degraded, ending with a feeble linear second joint, which is slightly longer in female than in male. Gnathopod 2 subchelate. Peraeopods 3–5, second joint expanded. Uropod 2 shorter than uropod 1 or 3; uropod 3, peduncle short, rami subfoliaceous. Telson rather short, deeply cleft.

BATEA CATHARINENSIS Müller

(Figures 1–4)

1865. *Batea catharinensis* MÜLLER, Ann. Mag. Nat. Hist., ser. 3, vol. 15, p. 276, pl. 10.
1903. *Batea secunda* HOLMES, The Amer. Naturalist, vol. 37, no. 436, p. 284.
1905. *Batea secunda* RATHBUN, Occasional Papers of the Bost. Soc. Nat. Hist., vol. 7. Fauna of New England, no. 5, p. 66.
1905. *Batea secunda* HOLMES, Bulletin of the Bureau of Fisheries for 1904, vol. 24, p. 499, text figure.

1906. *Batea catharinensis+B. secunda* STEBBING, Amphipoda, I, Gammaridea. Das Tierreich, vol. 21, pp. 355, 356; 729.
1913. *Batea secunda* SUMNER, OSBURN, and COLE, Bulletin of the Bureau of Fisheries for 1911, vol. 31, pt. 2, p. 651.
1918. *Batea secunda* KUNKEL, Conn. State Geological and Natural History Survey, Bulletin No. 26, p. 89, fig. 18.
1921. *Batea catharinensis* SHOEMAKER, Univ. of Iowa Studies. Studies in Nat. Hist., vol. 9, no. 5, p. 100.

Head; rostrum reaching to about two-thirds the length of the first joint of antenna 1, slightly curved downward, spear-shaped, sharply pointed; lateral angle rather blunt; lower anterior angle subquadrate. Eyes large, dark, reniform, larger in male than in female. Antenna 1 and 2 longer in male than in female. Antenna 1, second joint narrower and a little shorter than first, third joint narrower than second and about one-third as long, under edge of first and second joints in male bearing several fascicles of short setae, flagellum many-jointed, setae of alternate joints directed forward and backward in male and forward and downward in female, alternate joints in female bearing also sensory filaments. Antenna 2, fifth joint narrower but very little shorter than fourth, upper edge of fourth and fifth joints in male bearing several fascicles of short setae, lower edge of fourth and fifth joints in female bearing several fascicles of long setae, flagellum many-jointed, alternate joints in female bearing two long and one short seta on under side. Upper lip rounded and bearing a fringe of fine setules on rounded apex. Mandible, cutting edge narrow, sharply toothed throughout, accessory plate also toothed, five serrated spine teeth in spine-row of left mandible and four in that of right, molar strong, prominent, bordered by a single plumose setule and a row of fine teeth on upper edge, a strong protuberance between molar and base of palp, palp with second joint stouter but very little longer than third, both second and third joints provided on their front margins with numerous bristles. Maxilla 1, outer plate with 10 or 11 toothed spines, inner with four or five plumose setae, palp with first joint about one-half the length of second, which is provided distally with a few short, blunt spine-teeth and a few short setae. Maxilla 2, outer plate slightly wider and longer than inner, armed distally with many long curved bristles, inner plate armed distally with many bristles and two plumose setae. Maxilliped, outer plate reaching about three-fourths the distance along the second joint of palp, somewhat truncated distally and provided on the truncated end with a few plumose setae, inner edge provided with about five odontoid spines and a few short, curved, blunt bristles, inner plate provided on its truncated end with three short, stout odontoid spines, and on the end and inner edge with plumose setae, palp with third joint provided with a stout, curved claw. Lower lip, outer lobes large and distally rounded, inner lobes small, mandibular processes well developed.

Gnathopod 1 very slender, curved backward, not reaching end of second joint of gnathopod 2, a little longer and stouter in female than in male, second joint in male with a few setae along the front

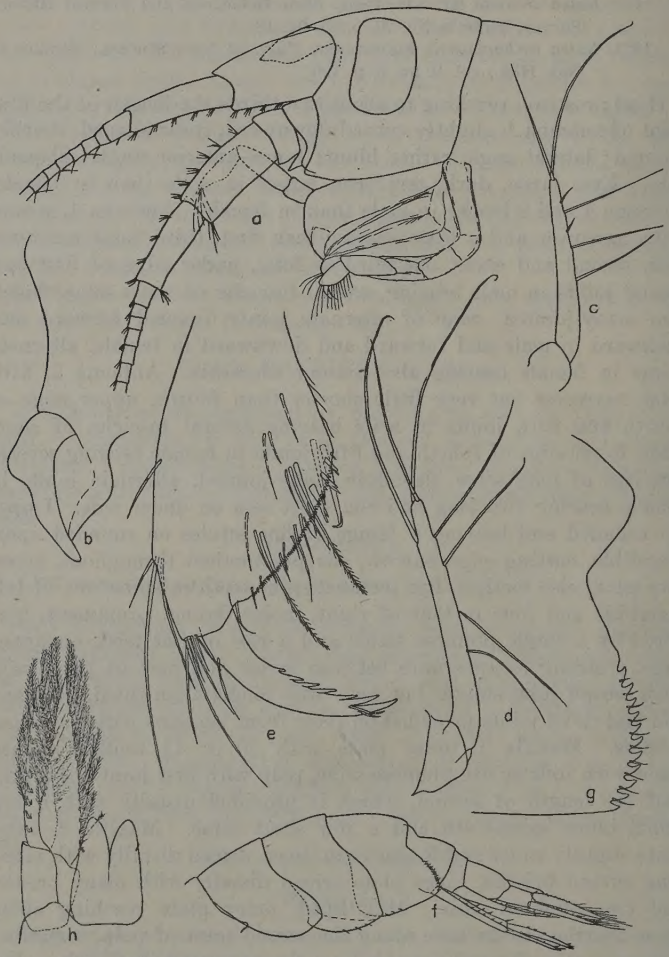

FIG. 1.—BATEA CATHARINENSIS MÜLLER, MALE, WOODS HOLE, MASS. *a*, HEAD AND ANTENNAE; *b*, UPPER LIP AND EPISTOME; *c* AND *d*, FIRST GNATHOPODS OF DIFFERENT INDIVIDUALS; *e*, GNATHOPOD 2, SHOWING TEETH OF PALM; *f*, ABDOMEN AND APPENDAGES; *g*, POSTERIOR LATERAL MARGIN OF ABDOMINAL SEGMENT 3; *h*, UROPOD 3 AND TELSON

margin, two long, curved setae at distal end and usually one on hind margin near distal end, in the female the setae on front margin more numerous, a group of curved setae at distal end and a long curved

seta on hind margin near apex. Gnathopod 2, second joint equal in length to fifth and sixth combined, third and fourth joints short, fifth joint greatly widened distally, the hind margin produced into

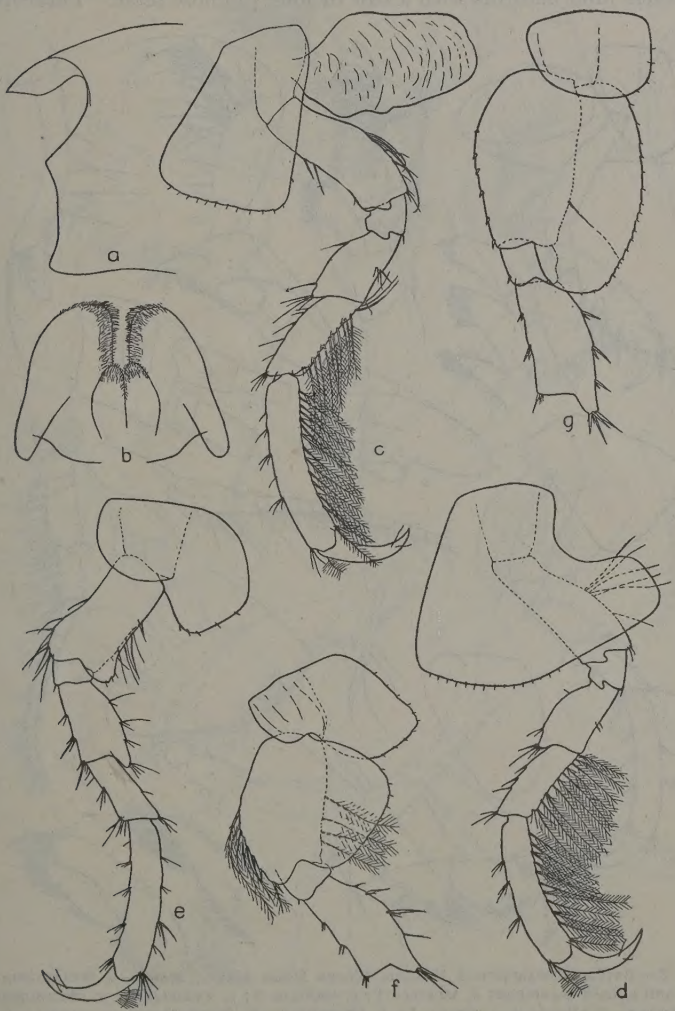

FIG. 2.—BATEA CATHARINENSIS MÜLLER, MALE, WOODS HOLE, MASS. *a*, HEAD; *b*, LOWER LIP; *c*, PERAEOPOD 1; *d*, PERAEOPOD 2; *e*, PERAEOPOD 3; *f*, PERAEOPOD 4; *g*, PERAEOPOD 5

a deep triangular lobe provided on front margin with many forward-pointing bristles, sixth joint one-fourth longer than fifth and nearly as wide, palm a little longer than hind margin, finely toothed

throughout, very oblique, and defined by a few double-pointed spines, finger equaling palm, curved, and bearing several forward-pointing teeth. Peraeopods 1 and 2, fifth and sixth joints in male provided on their hind margins with a row of long plumose setae. Peraeopod

FIG. 3.—BATEA CATHARINENSIS MÜLLER, WOODS HOLE, MASS. MALE.—*a*, GNATHOPOD 2; *b* AND *c*, LEFT MANDIBLE; *d*, MAXILLA 1; *e*, MAXILLA 2; *f*, MAXILLIPED; *g*, GNATHOPOD 1. FEMALE.—*h*, HEAD; *i*, ANTENNA 1; *j*, ANTENNA 2; *k*, INNER PLATE OF MAXILLA 1; *l*, GNATHOPOD 1; *m*, GNATHOPOD 2; *n*, PERAEOPOD 1; *o*, PERAEOPOD 2

3, distal end of second joint a little expanded in front and slightly lobed behind, remaining joints as in peraeopods 1 and 2. Peraeopod 4, second joint greatly expanded, widest through proximal portion, lower half of front margin provided with long plumose setae, and a

few long plumose setae arising from the lower half of the hind margin of the muscular portion of the joint, remaining joints as in the preceding peraeopods. Peraeopod 5 longest, second joint

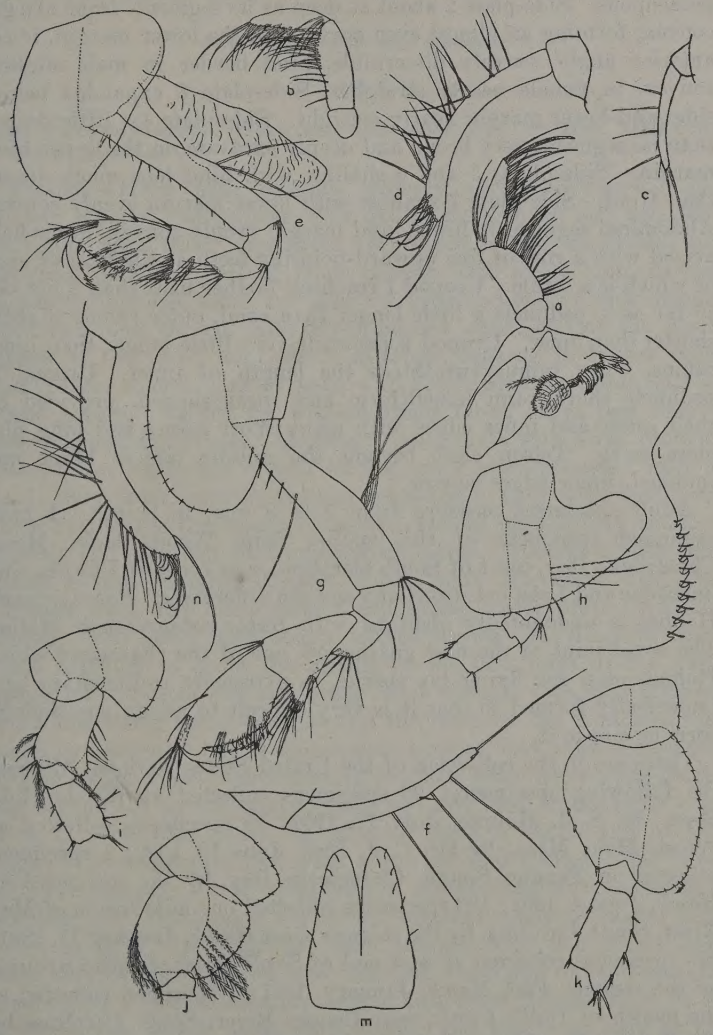

FIG. 4.—BATEA CATHARINENSIS MÜLLER, CHESAPEAKE BAY.—*a*, LEFT MANDIBLE, FEMALE; *b*, PALP OF LEFT MANDIBLE, FEMALE; *c*, GNATHOPOD 1, MALE; *d*, GNATHOPOD 1, FEMALE; *e*, GNATHOPOD 2, FEMALE. INSIDE MOUTH OF MAY RIVER, SOUTH CAROLINA.—*f*, GNATHOPOD 1, MALE; *g*, GNATHOPOD 2, MALE; *h*, PERAEOPOD 2, MALE; *i*, PERAEOPOD 3, MALE; *j*, PERAEOPOD 4, MALE; *k*, PERAEOPOD 5, MALE; *l*, POSTERIOR LATERAL MARGIN OF ABDOMINAL SEGMENT 3, MALE; *m*, TELSON, MALE. MOUTH OF BULL'S CREEK, NEAR COOPER RIVER, SOUTH CAROLINA.—*n*, GNATHOPOD 1, FEMALE

greatly expanded, widest through the proximal third, distal portion of hind margin produced into a broad, downward-projecting lobe reaching below the third joint, remaining joints as in the preceding peraeopods. Side-plate 2 about as deep as its segment, front margin convex, forming an almost even curve with the lower margin, lower anterior angle scarcely discernible, hind border in male slightly convex, in female nearly straight. Side-plate 3 expanded below, sides and lower margin nearly straight. Side-plate 4 a little deeper than its segment, very broad and deeply excavate on the upper hind margin. Side-plates 5 and 6 shallow with hind lobe much deeper than front. Side-plate 7 shallow with lower margin evenly convex. Abdominal segment 3, lower hind margin evenly convex, lower half armed with a row of fine upward-pointing teeth at the base of each of which is a setule. Uropod 1 reaching farther back than 2 but not so far as 3, peduncle a little longer than rami, outer ramus slightly shorter than inner. Uropod 2, peduncle very little longer than inner ramus, outer ramus two-thirds the length of inner. Uropod 3, peduncle short, rami lamelliform and spear shaped, provided on their outer and inner edges with many short spines and long plumose setae. Telson cleft beyond the middle, apices blunt and rounded, inner edges convex.

Adult specimens measure from 5 to 8 mm. in length. I have examined specimens of this species from Woods Hole, Mass., Chesapeake Bay, coast of South Carolina, west coast of Florida, and Barbados and I can not detect any specific differences. *Batea secunda* Holmes is undoubtedly identical with *Batea catharinensis* Müller. The coxal joint of the first gnathopod, one of the characters which Holmes used for fixing his species, is extremely rudimentary and imperfectly formed so that it is very difficult to assign any definite form or size to it.

There are in the collection of the United States National Museum the following specimens: 20 specimens collected at Woods Hole, Mass., by S. J. Holmes, July 18, 1901; 28 specimens collected at Woods Hole, Mass., by Dr. C. J. Fish, June 10, 1922; 3 specimens collected in Tangier Sound, Chesapeake Bay, by the steamer *Fish Hawk*, June 4, 1891; 100 specimens collected one mile inside of May River, South Carolina, by the steamer *Fish Hawk*, January 17, 1891; 200 specimens collected at west end of Skull Creek, South Carolina, by the steamer *Fish Hawk*, January, 1891; 1 specimen collected at the mouth of Bull's Creek, near Cooper River, South Carolina, by the steamer *Fish Hawk*, January 18, 1889; 1 specimen from Tampa Bay, Florida, collector and date unknown; several hundreds of specimens from Chesapeake Bay, collected by the steamer *Fish Hawk* during the years 1915 to 1921.

Three specimens collected by the Barbados-Antigua Expedition of 1918 at Pelican Island, Barbados, May 13, 1918, are in the collection of the University of Iowa.

BATEA RECTANGULATA Shoemaker

(Figures 5–7)

1925. *Batea rectangulata* SHOEMAKER, Bull. Amer. Mus. Nat. Hist., vol. 52, art. 2, p. 31, figs. 7–9.

Female.—Head with rostrum strongly curved downward and acutely pointed. Mandibles with five spine-teeth on left and four on right; palp, third joint about two-thirds as long as second, and provided on distal half of front margin with many long, curved, minutely-plumosed setae, and near the proximal end of back margin with two long curved, minutely-plumosed setae; one of the distal spines of the third joint much enlarged, making it appear quite dactyl-like; second joint of palp with stout setae on distal half of front margin. Lower lip without inner lobes, or at best only a mere suggestion of them. Maxilla 1, inner plate with seven plumose setae, below which are several setules, outer plate provided with 10 or 11 very stout, curved, toothed spine-teeth, palp with first joint about two-thirds the length of second, second joint evenly rounded distally and provided with many short spines. Maxilla 2 with both plates evenly rounded distally, inner plate furnished with two plumose setae and many long sharp spines, outer plate furnished distally with many long, sharp, curved spines. Maxillipeds, inner plate reaching to about the middle of the first joint of the palp, armed on truncated end and along inner margin with long plumose setae, one sharp spine-tooth among the setae on the truncated end could be discerned, but if others were present they were completely hidden by the mass of surrounding plumose setae, outer plate reaching beyond the second joint of palp and provided on the inner edge with 12 tooth-like spines, no plumose setae at distal end of this plate, outer edge provided with a row of fine setules. The three joints of the palp all of equal length, dactyl stout with downward-pointing tip. Gnathopod 1 with the terminal spines of second joint much as in *B. catharinensis*, front margin with five or six long setae, and two long curved setae near the distal end of hind margin. Gnathopod 2 proportionately longer and more slender than in *B. catharinensis*, second joint very slender and nearly as long as the third, fourth, fifth, and sixth joints combined, fifth joint slender and slightly longer than sixth, sixth joint slender, palm oblique, about two-thirds the length of hind margin and minutely serrated throughout its length, dactyl slightly curved and bearing four forward-pointing teeth and several setules on inner margin. Peraeo-

pod 1, fifth and sixth joints missing, second joint with a row of short, slender spines on front margin and two groups of long bristles near the distal end of hind margin. Peraeopod 2, fifth and

FIG. 5.—BATEA RECTANGULATA SHOEMAKER, SAN FRANCISQUITO BAY, GULF OF CALIFORNIA. FEMALE.—*a*, GNATHOPOD 1; *b*, GNATHOPOD 2; *c*, PERAEOPOD 1; *d*, PERAEOPOD 5

sixth joints missing, second, third, and fourth joints about as in peraeopod 1. Peraeopod 3, second joint with lobe of hind margin rounding and without any downward dip. Peraeopod 4, second

joint not wider above than below, but about the same width throughout, hind margin evenly convex. Peraeopod 5, second joint about

FIG. 6.—BATEA RECTANGULATA SHOEMAKER, SAN FRANCISQUITO BAY, GULF OF CALIFORNIA. FEMALE.—*a*, GNATHOPOD 2, SHOWING TEETH OF PALM AND FINGER; *b*, PERAEOPOD 2; *c*, PERAEOPOD 3; *d*, PERAEPOD 4

as broad as long, lower posterior margin not forming as deep a lobe as in *B. catharinensis*. Side-plates all much deeper than in *B.*

catharinensis. Side-plate 2 rectangular in outline, front and back margins nearly parallel, lower margin transverse, slightly convex and provided with a row of setules. Side-plate 3 extending slightly

FIG. 7.—BATEA RECTANGULATA SHOEMAKER, SAN FRANCISQUITO BAY, GULF OF CALIFORNIA. FEMALE.—*a*, HEAD AND FIRST TWO THORACIC SEGMENTS; *b*, LEFT MANDIBLE; *c*, PALP OF LEFT MANDIBLE; *d*, RIGHT MANDIBLE; *e*, PALP OF RIGHT MANDIBLE; *f*, MAXILLA 1; *g*, MAXILLA 2; *h*, MAXILLIPED; *i*, LOWER LIP

beyond the second joint of the peraeopod, sides nearly parallel but slightly wider below, lower margin transverse, very slightly convex and bordered by a row of minute setules. Side-plate 4 with hind margin not so deeply excavate as in *B. catharinensis*, lower margin unevenly convex and bordered by a row of minute setules. Side-plate 5 with hind lobe deeper and more acute than in *B. catharinensis*. Side-plates 6 and 7 differing very slightly from those of *B. catharinensis*. Posterior lateral margin of abdominal segment 3 bearing a greater number of serrations than that of *B. catharinensis*. Uropods about as in *B. catharinensis*. Telson proportionately shorter and broader than in *B. catharinensis*, lobes with apices acute and inside margins concave, each lobe with two setules near the apex, and each side of telson bearing three setules near the base. Length of the type specimen 6 mm. The only known specimen of this species was obtained by the steamer *Albatross* in 1911 in San Francisquito Bay, Gulf of California, and established the first record of the occurrence of this genus on the west coast of America. The type is in the collection of the United States National Museum, catalogue number 52360.

BATEA TRANSVERSA, new species

(Figures 8–11)

Female.—Head with rostrum evenly-curved downward and very acute, under edge evenly concave. Eyes large, black. Antennae normal. Mandible with third joint of palp a little over half the length of the second, spine arrangement of these two joints as in *B. rectangulata*, five spines in spine-row of left mandible, and four in that of right. Maxilla 1, inner plate with six or seven plumose setae, outer plate armed with stout, curved, toothed spines as in *B. rectangulata*, palp with first joint nearly two-thirds the length of the second. Maxilla 2, inner plate reaching nearly to the end of outer plate, spine and seta arrangement as in *B. rectangulata*. Maxillipeds, inner plate reaching nearly to the end of first joint of palp, armed on its truncated end with three rather blunt spine-teeth, and on the truncated end and inner margin with plumose setae, outer plate reaching nearly to the end of the second joint of palp, armed on its upper rounded end and inner edge with tooth-like spines, second joint of palp a little longer than first or third which are subequal, dactyl evenly curved throughout, point not dipping down as in *B. rectangulata*. Lower lip without inner lobes. Gnathopod 1 normal. Gnathopod 2 proportionally nearly as in *B. rectangulata*, fifth, and sixth joints long and narrow, sixth about four-fifths as long as fifth, widest at distal end, palm nearly transverse, being only slightly oblique, dactyl with three forward-pointing teeth on inner edge. Peraeopods 1 and 2 normal. Peraeopod 3, second joint

with prominent, downward projecting anterior and posterior lobes. Peraeopod 4, second joint proportionately shorter and broader than

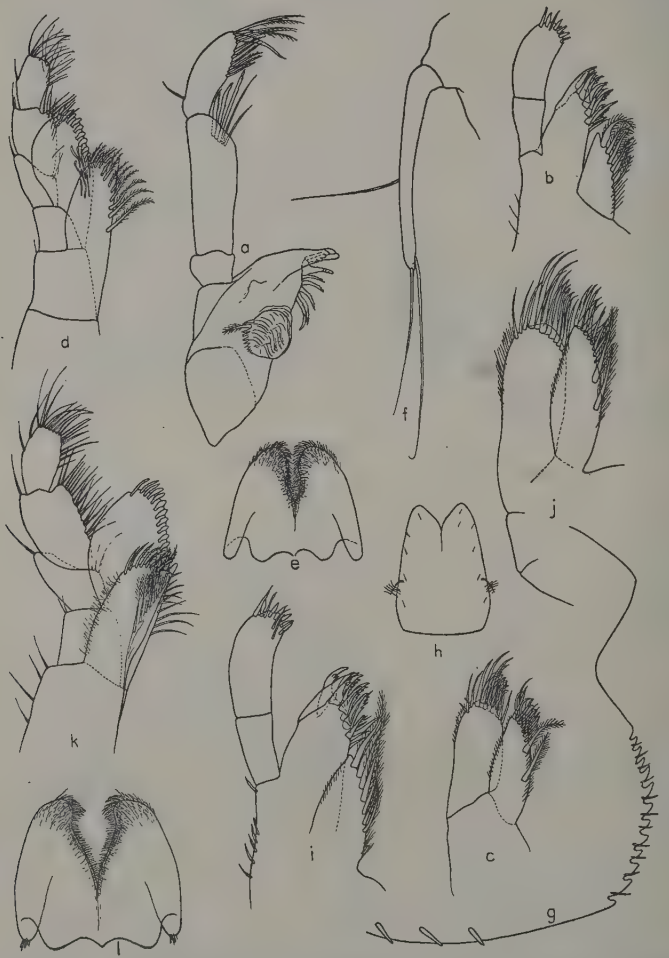

FIG. 8.—BATEA TRANSVERSA, NEW SPECIES, POINT LOMA, CALIFORNIA. MALE.—*a*, MANDIBLE; *b*, MAXILLA 1; *c*, MAXILLA 2; *d*, MAXILLIPED; *e*, LOWER LIP; *f*, GNATHOPOD 1; *g*, POSTERIOR LATERAL MARGIN OF ABDOMINAL SEGMENT 3; *h*, TELSON. CATALINA HARBOR, SANTA CATALINA ISLAND, FEMALE.—*i*, MAXILLA 1; *j*, MAXILLA 2; *k*, MAXILLIPED; *l*, LOWER LIP

in *B. rectangulata*, hind margin evenly convex and bearing shallow serrations, lower anterior and posterior lobes both dipping down

about the same distance. Peraeopod 5 much as in *B. rectangulata*, widest through upper part, posterior edge serrate. Side-plates much

FIG. 9.—BATEA TRANSVERSA, NEW SPECIES, CATALINA HARBOR, SANTA CATALINA ISLAND. FEMALE.—*a*, HEAD AND FIRST THREE THORACIC SEGMENTS; *b*, MANDIBLE; *c*, GNATHOPOD 1; *d*, GNATHOPOD 2, MUCH ENLARGED; *e*, PERAEOPOD 1; *f*, PERAEOPOD 3; *g*, POSTERIOR LATERAL MARGIN OF ABDOMINAL SEGMENT 3; *h*, TELSON

as in *B. catharinensis*. Abdominal segment 3, posterior lateral margin with teeth shaped and arranged much as in *B. rectangulata*.

Uropods normal. Telson with sides converging and each bearing a row of minute setules, cleft for only about one-third its length, lobes rather bluntly pointed and with inside edges slightly concave.

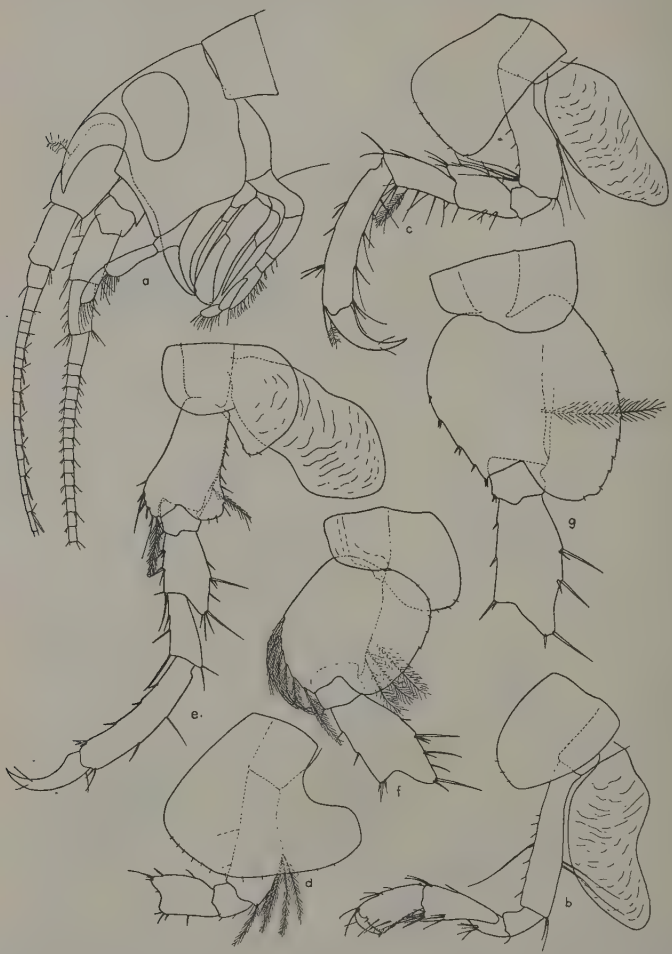

FIG. 10.—BATEA TRANSVERSA, NEW SPECIES, POINT LOMA, CALIFORNIA. MALE.—*a*, HEAD AND ANTENNAE; *b*, GNATHOPOD 2; *c*, PERAEOPOD 1; *d*, PERAEOPOD 2; *e*, PERAEOPOD 3; *f*, PERAEOPOD 4; *g*, PERAEOPOD 5

Length.—5 mm.

Locality.—One-half mile off the wireless station, Point Loma, California, August 20, 1918, collected by Dr. Waldo L. Schmitt.

Type in the United States National Museum, catalogue number 52301.

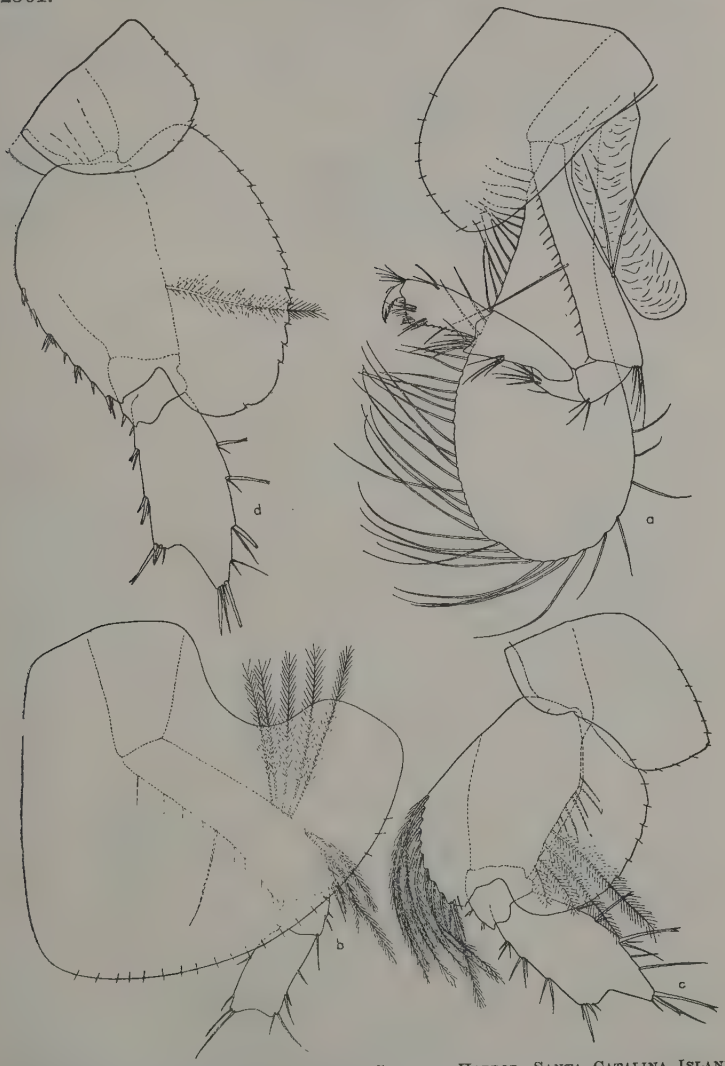

FIG. 11.—BATEA TRANSVERSA, NEW SPECIES, CATALINA HARBOR, SANTA CATALINA ISLAND. FEMALE.—*a*, GNATHOPOD 2; *b*, PERAEOPOD 2; *c*, PERAEOPOD 4; *d*, PERAEOPOD 5

Male.—Antenna 1, alternate joints of flagellum bearing a backward pointing seta and an enlarged sensory seta. Inner plate of maxilla 1 with six plumose setae. Mandibles as in female. Gnath-

opod 1 about as in *B. catharinensis*. Gnathopod 2 as in the female. Peraeopods as in the female. Uropods normal. Telson cleft about one-third of its length, lobes blunter than in female with apices rounding, a plumose setule near the center of outside edges.

The specific name of this species refers to the almost transverse palm of the second gnathopod. Specimens in the collection of the United States National Museum besides the type are as follows: 1 specimen collected at the entrance of Catalina Harbor, Santa Catalina Island, California, by the Venice Marine Biological Station, December 30, 1912; 54 specimens collected off Point Loma, California, by Dr. Waldo L. Schmitt, Aug. 1918.

BATEA LOBATA, new species

(Figures 12, 13)

Female.—Head with rostrum spear-shaped and pointing almost directly forward. Eyes large reniform, black. Lateral angle very flat and rounding. Lower anterior corner rounding. Antennae normal. Mandibles with five spine-teeth in spine-row of left and four in that of right, palp with third joint little shorter than second and armed on the distal front half with many long bristles one of the terminal ones of which is enlarged and dactyl-like, second joint expanded at the distal end and bearing a group of long bristles on this expansion, no bristles on the proximal part of the joint. Maxilla 1 with nine plumose setae on inner plate, outer plate and palp as in *B. rectangulata*. Maxilla 2 as in *B. rectangulata*. Maxillipeds, inner plate extending a little beyond the end of the first joint of the palp and bearing three spine-teeth on its truncated end, outer plate not reaching the end of the second joint of the palp, inner edge armed with a row of tooth-like spines, no plumose setae on end of plate, first joint of palp about two-thirds as long as second, second a little longer than third. Lower lip without inner lobes. Gnathopods 1 and 2 much as in *B. catharinensis*. Gnathopod 2, fifth, and sixth joints subequal in length and width, fifth joint longer than wide with the lobe of hind margin much less acute than in *B. catharinensis*, sixth joint with palm oblique, slightly convex and a little shorter than hind margin of joint, dactyl with four or five teeth on inner edge. Peraeopods much as in *B. catharinensis*. Second joint of peraeopod 3 with the lower posterior lobe a little more prominent and crenulate than in *B. catharinensis*. Second joint of peraeopod 4 not noticeably wider above than below, with hind margin evenly convex. Second joint of peraeopod 5 as broad as long, widest through upper third. Side-plate 2 as in *B. catharinensis*. Side-plate 3 with sides less divergent than in *B. catharinensis*. Side-plate 4 as in *B. catharinensis*. Side-plate 5 with hind lobe a little

more acute below than in *B. catharinensis*. Side-plates 6 and 7 as in *B. catharinensis*. Abdominal segment 3 with serrations of lateral margin very obscure, the lower ones are very flat with very minute upturned points while the upper ones are reduced to mere flattened

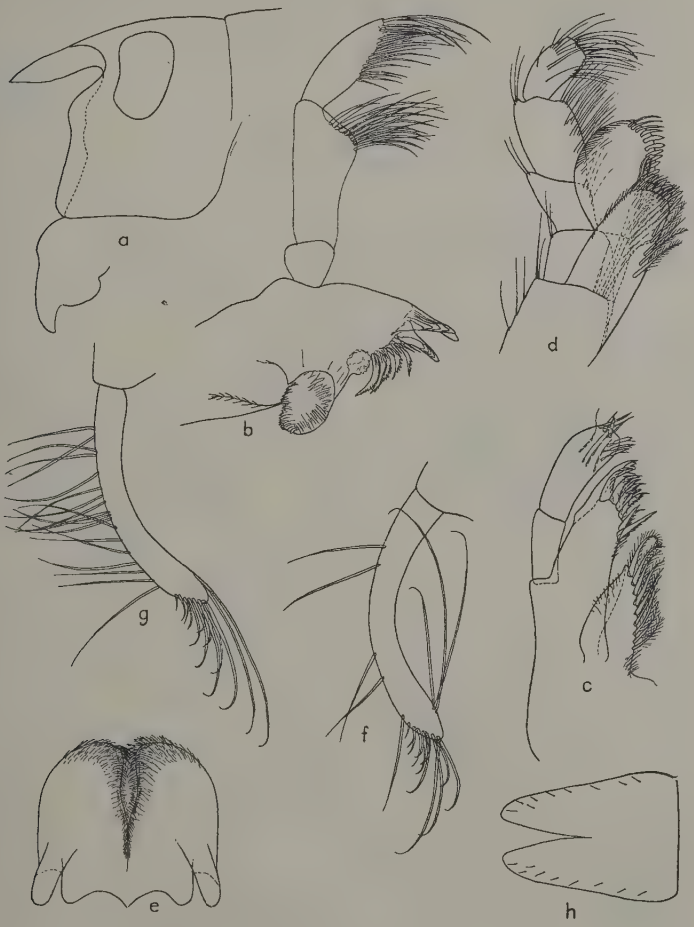

FIG. 12.—BATEA LOBATA, NEW SPECIES. FEMALE.—*a*, HEAD; *b*, MANDIBLE; *c*, MAXILLA 1; *d*, MAXILLIPED; *e*, LOWER LIP; *f* AND *g*, GNATHOPOD 1; *h*, TELSON

lobes. Uropods normal. Telson with outer edges furnished with a row of spinules, and lobes more acute than in *Batea catharinensis*.

Length.—6 mm.

Locality.—From end of pier at La Jolla, Southern California, collected by Percy S. Barnhart of the Scripps Institution, November 25, 1915.

Type.—United States National Museum catalogue number 52309. The specific name of this species refers to the very flat lobes which

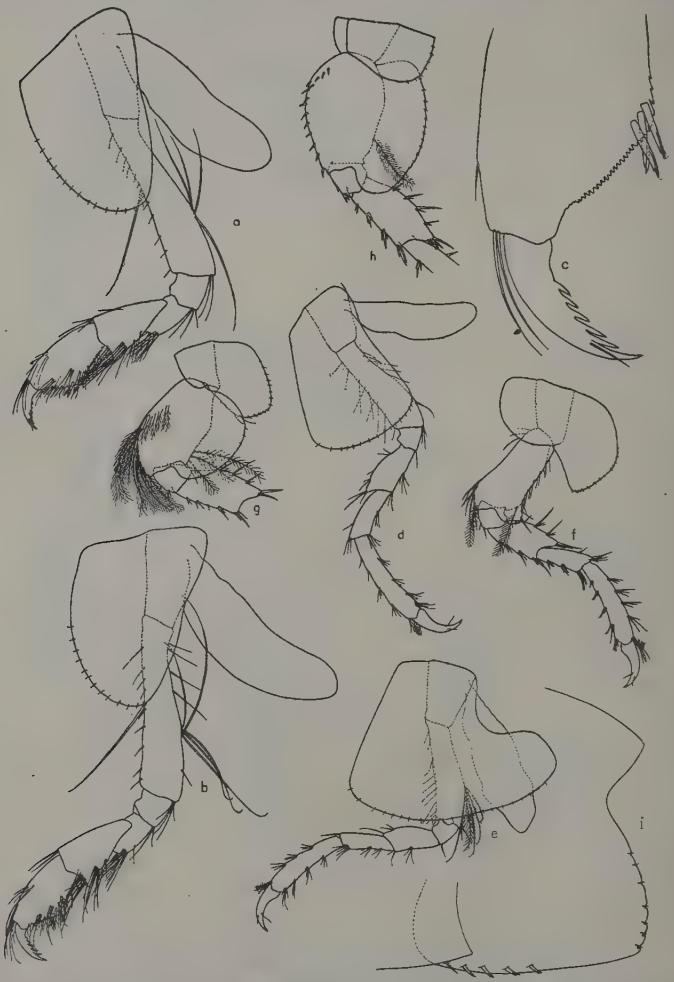

FIG. 13.—BATEA LOBATA, NEW SPECIES. FEMALE.—*a* AND *b*, GNATHOPOD 2; *c*, GNATHOPOD 2, MUCH ENLARGED; *d*, PERAEOPOD 1; *e*, PERAEOPOD 2; *f*, PERAEOPOD 3; *g*, PERAEOPOD 4; *h*, PERAEOPOD 5; *i*, POSTERIOR LATERAL MARGIN OF ABDOMINAL SEGMENT 3

take the place of the teeth on the posterior lateral edge of the third abdominal segment in the other known species of this genus. Besides the type there are in the collection of the United States

National Museum 13 specimens from La Jolla, southern California, collected by the Scripps Institution.

CARINOBATEA, new genus

Last thoracic and first and second abdominal segments strongly dentate. Lower lip without inner lobes. Outer plates of maxillipeds reaching to or a little beyond the end of second joint of palp. Otherwise as in *Batea*.

Genotype.—*Carinobatea cuspidata*, new species.

CARINOBATEA CUSPIDATA, new species

(Figures 14, 15)

Male.—Head, rostrum downward-curved, lance-shaped and sharply pointed, lateral angle shallow and blunt, lower front margin slightly concave, lower anterior angle rather sharp, eyes large and light yellow. Antenna 1 about three-fourths as long as body, first joint of peduncle with lower margin produced forward into a long sharp point extending beyond the middle of the second joint, second joint much smaller than first, third joint less than half the length of second, both first and second joints bearing tufts of setae on their lower margins, flagellum composed of many short joints which bear forward-pointing setae at their lower distal edges, no backward-pointing setae as in *B. catharinensis*. Antenna 2 as long as the entire body, fourth and fifth joints with tufts of setae on their upper margins, flagellum composed of many short joints which bear forward-pointing setae at their upper distal edges. Mandibles, four spine-teeth on right and five on left, palp with second joint slightly curved and bearing a few long bristles on the front distal edge, third joint a little over half the length of the second and bearing a row of fine bristles on the front edge and a stout dactyl-like spine at the distal end, the hind margin of third joint bearing a group of long curved bristles near the proximal end. Maxilla 1, outer plate with a row of 11 toothed spines, inner plate with eight plumose setae, palp with second joint very little longer than first, a row of short spines on distal end. Maxilla 2 as in *Batea catharinensis*. Maxilliped, outer plate reaching just to the end of the second joint of palp and bearing eight odontoid spines on inner edge, inner plate with three stout spine-teeth on truncated end. Lower lip without inner lobes or at best a mere suggestion of them. Gnathopod 1 very slender and recurved, widening a little toward the distal end, front margin bearing six slender setae, hind margin bearing five long curved setae arranged in a compact row near the distal end, two slender setae on distal extremity. Gnathopod 2, front and lower margins of side-plate evenly

curved, second joint shorter than side-plate, third joint at least two-thirds the length of second, fifth joint slender and about equal in length to third, lower distal edge produced into an acute angle, sixth joint shorter than fifth, palm not very oblique, shorter than hind

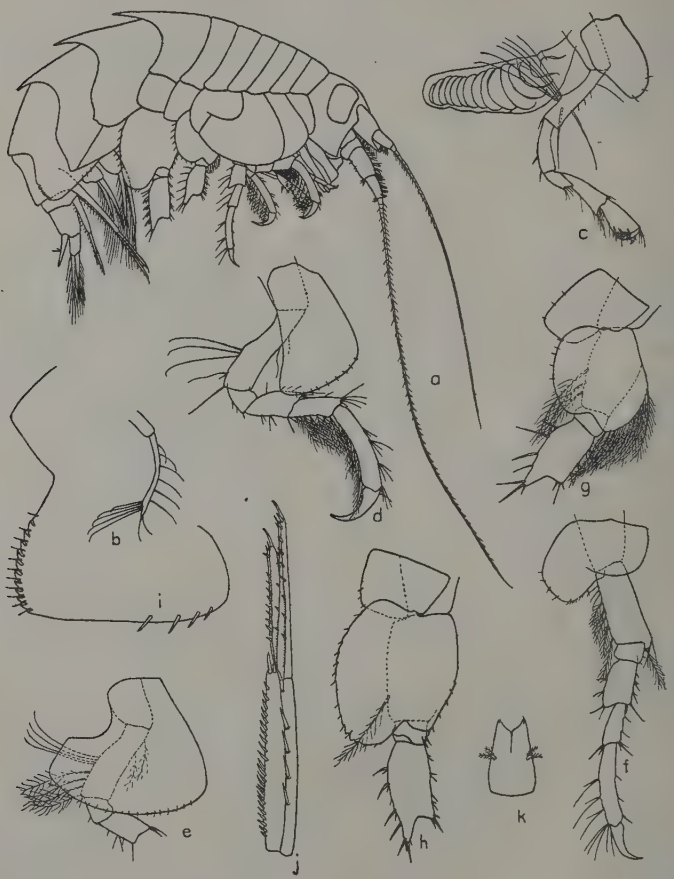

FIG. 14.—CARINOBATEA CUSPIDATA, NEW GENUS AND SPECIES. MALE.—*a*, ENTIRE ANIMAL; *b*, GNATHOPOD 1; *c*, GNATHOPOD 2; *d*, PERAEOPOD 1; *e*, PERAEOPOD 2; *f*, PERAEOPOD 3; *g*, PERAEOPOD 4; *h*, PERAEOPOD 5; *i*, POSTERIOR LATERAL MARGIN OF ABDOMINAL SEGMENT 3; *j*, UROPOD 1; *k*, TELSON

margin and minutely toothed throughout, several stout spines defining the palm. Dactyl equaling palm in length, curved, and bearing four teeth on inner margin. Peraeopod 1, side-plate with front margin slightly convex, lower margin slightly convex, hind margin

concave, and lower posterior corner evenly rounded, limb as in *Batea catharinensis*. Peraeopod 2, side-plate with hind lobe not so much produced as in *B. catharinensis*, lower margin evenly convex, second

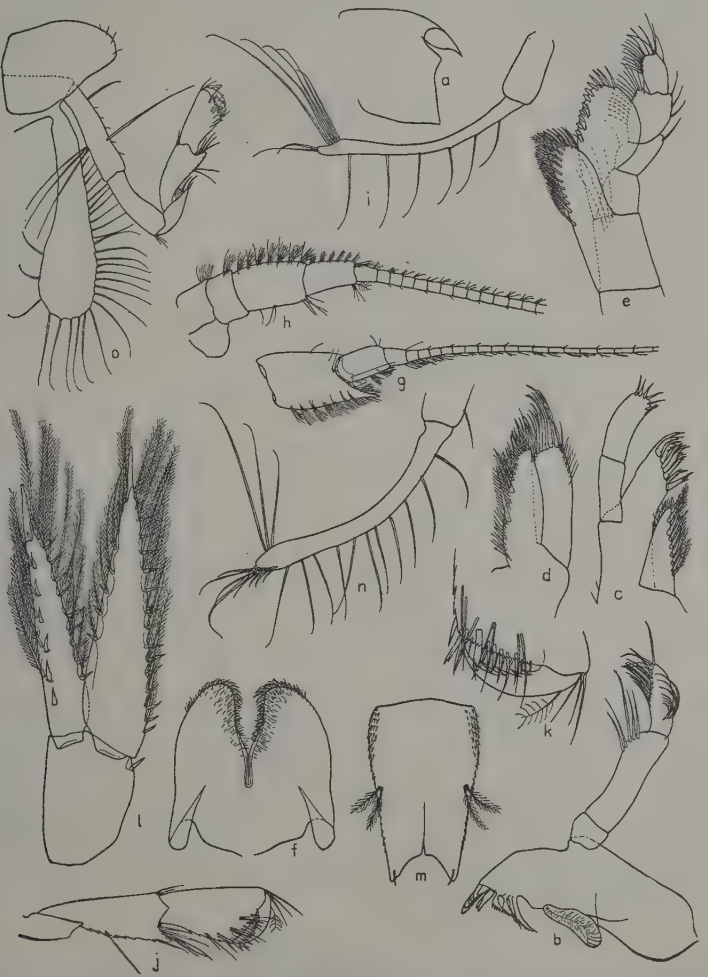

FIG. 15.—CARINOBATEA CUSPIDATA, NEW GENUS AND SPECIES. MALE.—*a*, HEAD; *b*, RIGHT MANDIBLE; *c*, MAXILLA 1; *d*, MAXILLA 2; *e*, MAXILLIPED; *f*, LOWER LIP; *g*, ANTENNA 1; *h*, ANTENNA 2; *i*, GNATHOPOD 1; *j*, GNATHOPOD 2; *k*, GNATHOPOD 2, ENLARGED; *l*, UROPOD 3; *m*, TELSON. FEMALE.—*n*, GNATHOPOD 1; *o*, GNATHOPOD 2

joint bearing four long plumose setae near lower hind margin and four long simple setae near middle, rest of limb normal. Peraeopod 3, side-plate differing little from that of *B. catharinensis*, second

joint not expanded below as in *B. catharinensis*, hind margin straight and bearing a row of plumose setae, no lobe at lower hind corner, rest of limb normal. Peraeopod 4, side-plate as in *B. catharinensis*, second joint widest through the lower part, hind margin evenly convex, rest of limb normal. Peraeopod 5, nearly as in *B. catharinensis*, but second joint proportionately a little shorter. The seventh thoracic and the first two abdominal segments are produced dorsally into prominent, sharp, backward-pointing processes. The lower lateral margin of the third abdominal segment with 11 upward-pointing teeth at the base of each of which is a setule. Uropod 1, outer edge of peduncle provided with a row of short, closely-set spines. Uropod 3, outer ramus slightly shorter than inner, both rami provided on their edges with a row of short spines and long plumose setae, each ramus ending in a long, slender, transparent point, at the base of which is a prominent lobe. Telson with sides convex at base then straight and converging, each side bearing two plumose setae at center, cleft not reaching middle, lobes with inside margins concave, apices pointed and each bearing a setule near the end.

Length.—5 mm.

Locality.—Between Water Island and Saint Thomas, Virgin Islands of the United States, June 28, 1915, 2–5 fathoms, collected by Clarence R. Shoemaker.

Type.—United States National Museum, catalogue number 52295.

Female.—Very much like the male but not quite so slender. Rostrum narrower and sharper than in male. Gnathopod 1 a little stouter than in male. Gnathopod 2 as in male but with the second joint longer than side-plate, and third joint three-fourths the length of second.

There are in the collection of the United States National Museum the following specimens: 7 specimens collected in shallow water about the Island of Saint Thomas, Virgin Islands of the United States, by Clarence R. Shoemaker during the summer of 1915; 1 specimen collected off the west coast of Florida by the steamer *Albatross*, between station numbers 2369–74, February 7, 1885, depth 64 fathoms; 1 specimen probably collected at Porto Rico, collector and date unknown.

CARINOBATEA CARINATA, new species

(Figure 16)

This species closely resembles *Carinobatea cuspidata* but differs in the following characters. Rostrum a little longer, narrower, and more acutely pointed than in *C. cuspidata*. Gnathopod 2, second joint as long as or a little longer than side-plate, third joint less than one-third the length of second, fifth and sixth proportionately

shorter and broader than in *C. cuspidata*, palm a little more oblique and more coarsely toothed. Peraeopod 5, second joint much wider above than below with hind margin nearly straight and coarsely serrated. The last thoracic and the first two abdominal segments produced backward dorsally into sharp points, and these segments

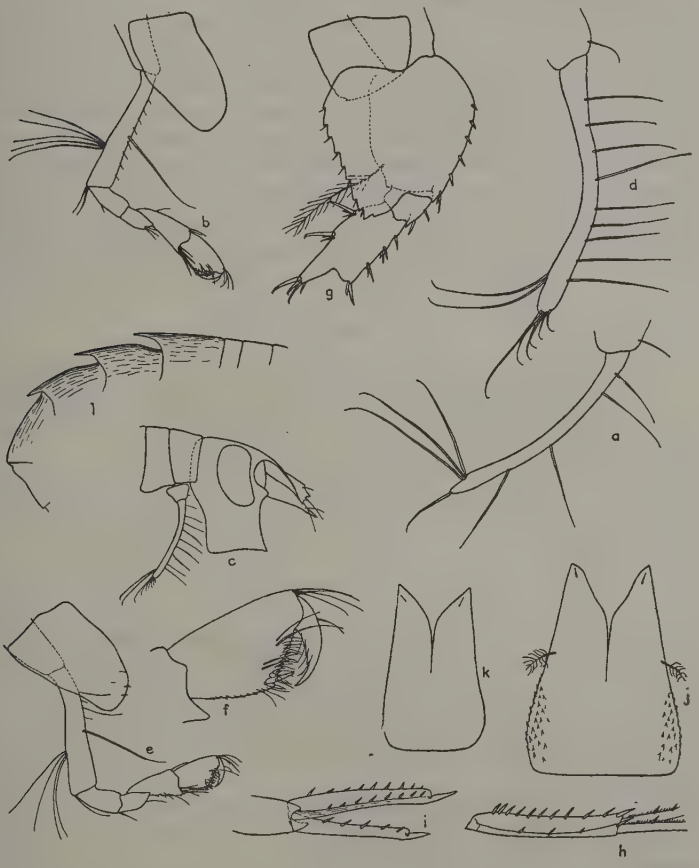

FIG. 16.—CARINOBATEA CARINATA, NEW GENUS AND SPECIES. MALE.—*a*, GNATHOPOD 1; *b*, GNATHOPOD 2. FEMALE.—*c*, HEAD AND GNATHOPOD 1; *d*, GNATHOPOD 1; *e*, GNATHOPOD 2; *f*, HAND, ENLARGED; *g*, PERAEOPOD 5; *h*, UROPOD 1; *i*, UROPOD 3; *j*, TELSON; *k*, TELSON OF ANOTHER INDIVIDUAL; *l*, ABDOMEN, SHOWING CARINAE

compressed dorsally forming slight but distinct carinae. Uropod 1 with less than half as many spines on outer edge of peduncle as in *C. cuspidata*. Uropod 3 not so broad and flat as in *C. cuspidata*, but with similar points and lobes at the ends of the rami. These rami are probably furnished with long plumose setae as in *C. cuspi-*

data, but the specimens having been in alcohol since 1885, these setae have all become detached except in a couple of specimens where there are one or two still remaining near the extremity of the rami. Telson cleft a little beyond the middle, lobes acute with inside edges either slightly concave or slightly convex.

Length.—Female, 5 mm.

Locality.—Albatross station 2405, off the west coast of Florida, 28° 45′ 00″ N., 85° 02′ 00″ W., March 15, 1885, depth 30 fathoms.

Type.—United States National Museum, catalogue number 52315.

There are in the collection of the United States National Museum besides the type, the following specimens: 1 specimen, *Albatross* station 2369–74, off west coast of Florida, February 7, 1885, depth 26 fathoms; 39 specimens, *Albatross* station 2405, off the west coast of Florida, 28° 45′ 00″ N., 85° 02′ 00″ W., March 15, 1885, depth 30 fathoms; 1 specimen *Albatross* station 2409 off west coast of Florida, 27° 04′ 00″ N., 83° 21′ 15″ W., March 18, 1885, depth 26 fathoms.

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